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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/858,337	05/15/2001	William J. Schaff	1153.044US1	1100

7590 11/04/2002
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EXAMINER

DUONG, KHANH B

ART UNIT PAPER NUMBER

2822

DATE MAILED: 11/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/858,337

Applicant(s)

SCHAFF ET AL.

Examiner

Khanh Duong

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 September 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

This Office Action is in response to the amendment, Paper No. 5, filed on September 16, 2002. Accordingly, claims 18 and 19 were amended, and 20-30 were cancelled. Currently, claims 1-19 are pending in the application.

Response to Arguments

Applicant's arguments with respect to claims 1-19 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 6-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re claim 6, line 1, "the beams", and line 2, "the desired thickness" lack antecedent basis.

Re claim 7, line 2, "the alternating beams" lacks antecedent basis.

Re claim 8, line 3, "the desired thickness" lacks antecedent basis.

Re claim 9, line 1, "the desired thickness" lacks antecedent basis.

Re claim 10, line 1, "the beams" lacks antecedent basis.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 11 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Hooper et al. (US 6,146,458).

Hooper et al. discloses a method of forming a layer of AlN of desired thickness on a semiconductor substrate using molecular beam epitaxy (MBE) (see col. ²8, lines 51-64) comprising the steps of: applying beams of Al; applying alternate beams of remote plasma RF nitrogen with the beams of Al to produce the layer of AlN of desired thickness; and inherently delaying a predetermined amount of time between the alternating beams.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 12 and 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hooper et al. (US 6,146,458).

Hooper et al. discloses a method of forming a layer of AlN of desired thickness on a semiconductor substrate using molecular beam epitaxy previously as described which method is repeated herein.

Re claims 12 and 14-19, Hooper et al. fails to show: forming the AlN layer to a thickness of approximately 500 Angstroms; alternately applying the beams at approximately less than 300°C for approximately two seconds; and delaying approximately two seconds between the alternating beams.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Hooper by selecting such thickness, temperature and times as claimed, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shealy et al. (WO 01/13436) in view of Yamaguchi (JP 60195978) and Hooper et al. (US 6,146,458).

Shealy et al. discloses a method of forming a field effect transistor (see FIG. 6; page 5, line 31 to page 6, line 2) comprising the steps of: forming a channel heterojunction field effect transistor 10 having a top surface; and applying a dielectric layer 32 of silicon nitride (or silicon dioxide or polyimide) to the top surface of the heterojunction field effect transistor 10.

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Re claims 1, 3-5 and 7, Shealy et al. fails to show applying AlN to the top surface of a heterojunction field effect transistor using molecular beam epitaxy (MBE).

Yamaguchi teaches to apply AlN 8 to the top surface of a field effect transistor (see English Abstract) but does not specifically mention the use of MBE to form the AlN. Hooper et al. teaches to form AlN using MBE with alternating beams of Al and remote plasma RF nitrogen (see col. 5, lines 51-64).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Shealy et al. with the combined teaching of Yamaguchi and Hooper et al. so as to reduce the surface effects responsible for limiting both the RF current and breakdown voltages of the devices.

Re claims 2, 6, and 8-10, Shealy et al. fails to show: forming the AlN layer to a thickness between approximately 500 and 2000 Angstroms; alternately applying the beams at approximately 150°C for approximately two seconds; and delaying approximately two seconds between the alternating beams.

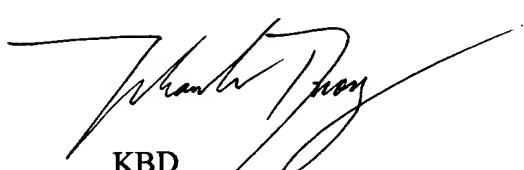
It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Shealy et al. by selecting such thickness, temperature and times as claimed, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh Duong whose telephone number is (703) 305-1784. The examiner can normally be reached on Monday - Friday (9:00 AM - 6:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian, can be reached on (703) 308-4905. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3431 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


KBD
October 30, 2002


AMIR ZARABIAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800